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Engineer Research and Development Center

Fluorescence Remote Sensing

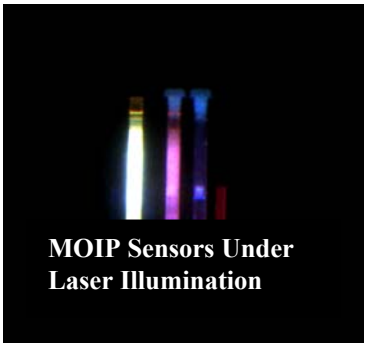
Description and Background

The Fluorescence Remote Sensing Lab (FRSL) at ERDC TEC is engaged in basic and applied research in fluorescence sensing focused on the development and testing of fluorophores for recovery by remote sensing. ERDC FRSL guides the development and testing of organic (living) and inorganic materials that may be used for the detection and mapping of harmful agents or environmental threats of relevance to the warfighter. The goal of the lab is integrated "smart" sensing to support the Objective Force.

Key Capabilities

ERDC FRSL has the capabilities to measure both steady-state and lifetime (decay) fluorescence spectra for fluorophores using state-of-the-art spectrometers including a frequency-domain lifetime spectrofluorometer that can measure fluorescence decays in picosecond lifetimes. In addition, the lab supports imagery based fluorescence measuremtns using laser-induced fluorescence as well as passive fluorescence measurements by Fraunhofer Line Discrimination. These measurements support defense, intelligence, and mapping agencies with baseline research in polymer detection, backgrounds, and characterization of fluorophores for environmental analysis.

Current Status



MOIP Sensors Under Laser Illumination

ERDC FRSL research in synthesis of fluorescent molecular (optical) imprinted polymers (MOIPs) and proteins has led to novel ways to improve signal to noise levels in fluorophores (improved quantum efficiency) for recovery by synoptic sensors. In collaboration with government and academia, the lab has been leading the measurement of fluorophore efficiency for operational remote sensing. These measurements are critical to developing fluorophore labels possessing signals that are strong and survivable. FRSL's precision fluorescence measurements assist in the development and synthesis of specific fluorophores by customers needing to test sensing characteristics of fluorescent reporters. Recent work has involved synthesis of a fluorescent molecular (optical) imprinted polymer for biological agent / constituent detection and the development of suitable detectors for (distributed) geospatially relevant, fluorescence-powered smart sensors.

Point of Contact

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